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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL BRIEF FOR THE APPELLANTS


Ex parte UENO et al.

EXHAUST EMISSION CONTROL SYSTEM
FOR AN INTERNAL COMBUSTION ENGINE

Serial Number: 10/060,058
Filed: January 31, 2002
Appeal No.:
Group Art Unit: 3748
Examiner: T. Nguyen

A check in the amount of Three Hundred and Twenty Dollars (\$320.00) is enclosed to cover the official fees for this Appeal Brief. Please charge any fee deficiencies required with respect to this paper, or overpayment to our Deposit Account No. 01-2300, referencing docket number 107355-00052.

Respectfully submitted,


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In re the Application of:

UENO et al

Application No.: 10/060,058

Filed: January 31, 2002

For: EXHAUST EMISSION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION
ENGINE

Art Unit: 3748

Examiner: T. Nguyen

Attorney Dkt. No.: 107355-00052

BRIEF ON APPEAL

I. INTRODUCTION

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This is an appeal from the action of the Examiner dated February 25, 2003, finally rejecting claims 1, 4, 6 and 7 as being unpatentable over certain prior art under 35 U.S.C. §103. A Notice of Appeal was timely filed on July 25, 2003 with a Petition for Extension of Time.

II. REAL PARTY IN INTEREST

The real party in interest in present application on appeal is HONDA GIKEN KOGYO KABUSHIKI KAISHA of 1-1, Minami-Aoyama 2-chome, Minato-ku, Tokyo, Japan, by virtue of an Assignment recorded in the U.S. Patent and Trademark Office on March 13, 2002 at Reel 012688, Frame 0982.

III. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the Appellant, Appellants' representative or Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

IV. STATUS OF CLAIMS

Claims 1, 4, 6 and 7 are being appealed. Claim 1 is independent. Claim 4, 6 and 7 depend directly or indirectly from claim 1. Claims 2, 3 and 5 have allowable subject matter. The claims on appeal are set forth in the attached Appendix I.

V. STATUS OF AMENDMENTS

All Amendments have been entered.

VI. SUMMARY OF THE INVENTION

A. Summary

The present invention discloses a gas exhaust emission control system for cleaning exhaust gases discharged the adsorbent material and a main exhaust passage without adsorbent material. A switching device is controlled to switch an exhaust gas flow path to the bypass exhaust passage both when the adsorbent material adsorbs the HC and when the release of HC is completed. The switching device is controlled to switch the exhaust gas flow path to the main exhaust passage only when the adsorbed HC is released from the adsorbent material.

Accordingly, the deposits in the adsorbent material can be removed, since the exhaust gas flows into the adsorbent material after the release of HC is completed.

B. The Claimed Invention

Claim 1 recites an exhaust emission control system of an internal combustion engine for cleaning exhaust gases discharged from the internal combustion engine including an exhaust system defining a main exhaust passage connected to an internal combustion engine, and a bypass exhaust passage which branches off and joins back to the main exhaust passage. A switching device switching an exhaust gas flow path to either of the main exhaust passage and the bypass exhaust passage. An adsorbent material disposed within the main exhaust passage for adsorbing unburned constituents of exhaust gases introduced into the main exhaust passage and releasing the unburned constituents as temperature increases. A control device operable to control the switching device. The control device switches the exhaust gas flow path to the main exhaust passage when the adsorbent material absorbs the unburned constituents, the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburned constituents is released from the adsorbent material, and the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed.

VII. THE FINAL REJECTION

Claims 1-7 are pending in this application. Claims 2, 3 and 5 have allowable subject matter.

Claims 1, 4, 6 and 7 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto et al. (U.S. Patent No. 5,647,206, "Yamamoto") in view of Tanaka et al. (U.S. Patent No. 5,956,947, "Tanaka").

VIII. ISSUES ON APPEAL

The issue on appeal is whether claims 1, 4, 6 and 7 are unpatentable under 35 U.S.C. § 103 over Yamamoto in view of Tanaka.

XI. GROUPING OF CLAIMS

Each claim of this patent application is separately patentable, and upon issuance of a patent, will be entitled to a separate presumption of validity under 35 U.S.C. § 282. For convenience in the handling of this appeal, claims 1, 4, 6 and 7 stand or fall together.

X. APPELLANT'S ARGUMENTS

The Law

In order to be unpatentable under 35 U.S.C. § 103, several basic factual inquiries must be made to determine obviousness or non-obviousness of the patent application claims. These factual inquiries are set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1996):

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; the level of ordinary skill in the pertinent art resolved. Against this backdrop, the obviousness or non-obviousness of the subject matter is determined.

Also, as stated by the Federal Circuit in In re Ochiai, 37 U.S.P.Q. 2d 1127, 1131 (Fed. Cir. 1995):

[t]he test of obviousness *vel non* is statutory. It requires that one compare the claim's subject matter as a whole with a prior art to which the subject matter pertains. 35 U.S.C. § 103.

The inquiry is highly fact-specific by design.... When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). (Emphasis added.)

When rejecting claims under 35 U.S.C. § 103, an Examiner bears an initial burden of presenting a *prima facie* case of obviousness. A *prima facie* case of obviousness is established only if the teachings of the prior art would have suggested the claimed subject matter to a person of ordinary skill in the art. If an Examiner fails to establish a *prima facie* case, the rejection is improper and will be overturned. See: In re Rijckaert, 9 F.3d 1531, 28 U.S.P.Q. 2d. 1955 (Fed. Cir. 1993). "If examination... does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to the grant of the patent." In re Oetiker, 977 F.2d 1443, 1445-1446 24 U.S.P.Q. 2d. 1443, 1444 (Fed. Cir. 1992).

A. Rejection of claims 1, 4, 6 and 7 under 35 U.S.C. § 103(a)

The Office Action finally rejects claims 1, 4, 6 and 7 under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto et al. (U.S. Patent No. 5,647,206, "Yamamoto") in view of Tanaka et al. (U.S. Patent No. 5,956,947, "Tanaka").

The Office Action takes the position that Yamamoto discloses all the elements of the claimed invention, with the exception of disclosing that the control device further switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed. Tanaka is cited for disclosing this

limitation. However, Appellants submit that claims 1, 4, 6 and 7 recite subject matter that is neither disclosed nor suggested by any combination of the prior art.

In making this rejection, the Office Action takes the position that the combination of Yamamoto and Tanaka discloses all of the elements of the claimed invention. However, it is respectfully submitted that the prior art fails to disclose or suggest the structure of the claimed invention, and therefore, fails to provide the advantages of the present invention. For example, in the exhaust emission control system of the present invention, the control device switches the exhaust gas flow path to the main exhaust passage when the adsorbent material adsorbs the unburned constituents, the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburned constituents is released from the adsorbent material, and the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed.

As a result of the claimed configuration, the exhaust gas flow path is switched to the main exhaust passage all the time, except while the unburned constituents are allowed to be released from the adsorbent material, i.e., almost all the time while the internal combustion engine is in operation, so that the exhaust gases are allowed to flow through the main exhaust passage. Thus, even if deposits such as soot are deposited in the adsorbent material when the exhaust gases pass through the adsorbent material, the adsorbent material is put in a highly heated state by the highly heated exhaust gases which flows through the main exhaust passage, and the deposits are burned with oxygen left unused in the exhaust gases due to fuel cuts taking place while the internal combustion engine is in operation, whereby the deposits can be removed from the

adsorbent material. In addition, as a further benefit and advantage, the frequency at which the switching device performs the switching operation can remarkably be reduced by allowing the switching device to switch the exhaust gas flow path only when the unburned constituents are allowed to be released from the adsorbent material. Still further, the durability of the system can be improved.

Specifically, in the Office Action dated February 25, 2003, and in response to Appellants' arguments proffered in May 27, 2003 Response, the Advisory Action dated June 26, 2003, the Examiner states that step S5 of Fig. 2, and column 5, line 63 to column 6, line 21 Yamamoto discloses that after time t_a has elapsed, honeycomb body 12 begins to release the adsorbed hydrocarbons, and valve 8 is controlled to assume the valve-closed position in order to allow the exhaust gas to flow through the bypass passage 5b only.

1. Summary of U.S. Patent No. 5,647,206, Yamamoto et al.

Yamamoto discloses an exhaust emission purification apparatus. As shown in Fig. 1, the adsorption device 5 includes a passage 5a provided with a honeycomb body 12 and a bypass passage 5b containing a flow of exhaust gas which does not pass through honeycomb 12. A switching valve 8 switches and selects the passage 5a or bypass passage 5b. When the switching valve 8 is operated in the valve-open position, the exhaust gas flow passes through passage 5a and flows through the honeycomb body 12 carrying adsorbent composed of hydrophobic zeolite, and HC is adsorbed by the adsorbent. As a result, exhaust gas after HC has been eliminated is released from exhaust pipe 7 to the atmosphere.

As the engine warms up, the exhaust gas temperature rises. After a predetermined time t_a passes, the HC-adsorbable temperature of the adsorbent and the separation speed of the adsorbent become equalized in a temperature at which separation of the HC is reached, switching valve 8 assumes a valve-closed position. Consequently, the exhaust gas flows through the bypass passage 5b and the exhaust gas containing no HC passes through the bypass passage 5b and is released into the atmosphere.

However, upon review of Yamamoto, the predetermined time t_a is a time of starting the release of the unburned constituents. When a predetermined time $t_a + t_b$ has passed, it is determined that the release from the adsorbent material is completed, then the processing is finished.

After t_a has passed, the switching device for the exhaust passage is operated such that the gas flows into the passage without the adsorbent material (See col. 5, line 65 – col. 6, line 12 and S5 of Fig. 2). After $t_a + t_b$ has passed, the recirculation passage is closed, but the operation of the switching device is not described (see col. 7, lines 14-22 and S8 of Fig. 2).

Therefore, contrary to the Examiner's assertion, at no point does Yamamoto disclose or suggest that the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburnt constituent is released from the material. Still further, Yamamoto fails to disclose or suggest that the control device then switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburnt constituent is completed, as recited in Appellants' claim 1. The Office Action dated February 2003 admits that Yamamoto fails to disclose that the

control device further switches the exhaust gas flow path to the main exhaust path when a release of the adsorbed unburnt constituents is completed.

2. Summary of U.S. Patent No. 5,956,947, Tanaka et al.

Tanaka discloses an exhaust gas purifying apparatus and method internal combustion engines where the gas passes through the adsorbent material passage only in a predetermined condition after the release from the adsorbent material. As shown in Fig. 1, two exhaust pipes 2a and 2b are connected to engine 1 and are emerged into a single pipe. The exhaust pipes 2a and 2b are again separated into two exhaust pipes 8a and 8b. Each of the exhaust pipes 8a and 8b is connected to a muffler 9a and 9b located on the rear side of the chassis. Catalysts 3a and 3b are provided in the two exhaust pipes 2a and 2b, respectively. An adsorbent sleeve 4 is provided at a portion in which the exhaust pipes 2a and 2b are merged into one downstream of the catalysts 3a and 3b. The interior of the adsorbent sleeve 4 is divided into two flow paths A and B, and the adsorbent for adsorbing hydrocarbon (HC) is provided in one of the flow paths. A zeolite system adsorbent 42 is provided in flow path A for adsorbing the hydrocarbon HC contained in the exhaust gas.

A bypass valve 40 selectively opens or closes the flow path A and the flow path B and is mounted in the outlet portion C of the adsorbent sleeve 4. The bypass valve 40 is connected through a lever 43 and a diaphragm chamber 41 mounted outside the adsorbent sleeve 4. The lever 43 rotates about a fulcrum 44. When the end of the lever 43 on the side of the diaphragm chamber 41 is lowered, the bypass valve 40 is lifted by the end portion of the lever 43 on the side of the bypass valve 40. This results in the flow path B being opened and the flow path A being closed. However, when the

end of the lever 43 on the side of the diaphragm chamber 41 is lifted, the bypass valve 40 is lowered by the end portion of the lever 43 on the bypass valve 40. This results in the flow path A being open and the flow path B being closed.

The Office Action dated February 25, 2003 takes the position that Tanaka discloses that the control device switches the exhaust gas flow path to the main exhaust passage when the adsorbent material adsorbs the unburned constituents in steps 402 through 406 and lines 28-37 of column 8, and Fig. 4 and 5. The Office Action dated February 25, 2003 further took the position that Tanaka discloses that the control device switches the exhaust gas flow path to the bypass exhaust passage when the unburned constituents are released from the adsorbent material at steps 404, 409 through 412, line 38 of column 8 to line 16 of column 9 and Fig. 6. The Office Action dated February 25, 2003 also takes the position that Tanaka discloses that the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed at steps 406, 412 through 414, and lines 17-52 of column 9.

However, in Tanaka, when the adsorbent material adsorbs, a gas flows through the gas flow path A (adsorbent side). When adsorbed material is released, most of the gas flows through the gas flow path B (bypass side). Further, when a fuel is cut off after the release of the adsorbed material, or when a gas being in lean condition, a gas flows through the gas flow path A (bypass side). See col. 8, line 28 - col. 9, line 52. The gas flows into the passage with the adsorbent material in case that the amount of the oxygen is large (fuel cut or deceleration lean state) after the release of HC is completed. See col. 9, line 16 – col. 10, line 19 and Fig. 4.

Therefore, the gas flows into the passage with the adsorbent in a predetermined condition after the release of HC is completed.

Contrary to this, in the present invention, the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburned constituents is released from the adsorbent material, as recited in Appellants' claim 1. Furthermore, the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburnt constituents is completed, as also recited in Appellants' claim 1.

As previously stated, a benefit and advantage of the present invention is that deposits such as soot can be burned and removed from the adsorbent material. Furthermore, the frequency at which the switching device switches the exhaust gas flow path to either of the main exhaust passage and the bypass exhaust passage is reduced, thereby increasing the reliability of the switching device and improving the durability of the exhaust control system.

Still further, in the Office Action dated February 25, 2003, and in the Advisory Action dated June 26, 2003, the Examiner asserts that it would have been obvious to one having ordinary skill in the art to modify Yamamoto by the teachings of Tanaka in order to provide an effective way to remove soot adhered to the adsorbent. However, Appellants' respectfully submit that this is impermissible hindsight. In Yamamoto, the object is to promptly release HC from the adsorbent material. (See column 2, lines 41-54). Yamamota does not disclose that residual soot adhered to the adsorbent material is removed. But in Tanaka, the object is to remove residual soot, as discussed at

column 2, lines 10-14. Therefore, there is no suggestion or motivation in Tanaka as to why one would be compelled to modify Yamamoto in the manner suggested.

As such, Appellants respectfully submit that the requisite suggestion or motivation in either of the references to modify and/or combine the references as alleged by the Examiner is absent. Furthermore, both references, even combined, fail to teach or suggest all of the claimed features of Appellants' recited invention. Additionally, the teaching or suggestion to make the alleged modification and/or combination is absent from the references and only found in the Appellants' disclosure. Accordingly, Appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness as outlined by 35 U.S.C. § 103, MPEP § 706.02(j).

In other words, Appellants strongly, but respectfully, submit that the only teaching or suggestion of the claimed structural features exist in Appellants' own disclosure. The Office Action is attempting to improperly use hindsight, based on the teachings in the Appellants' disclosure, to say that it would have been obvious to combine Yamamoto et al. with Tanaka et al. to arrive at the claimed invention.

In addition, MPEP § 2143 also states that the prior art must contain some motivation or incentive to modify and/or combine references in such a way as to yield the claimed invention. Although the motivation or incentive does not need to be explicit in a cited reference, it must be inherent. There is no such suggestion or motivation explicit or inherent.

In sum, as discussed above, the combination of Yamamoto and Tanaka fails to disclose an exhaust emission control system wherein the control device switches the exhaust gas flow path to the main exhaust passage when the adsorbent material

adsorbs the unburned constituents, the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburned constituents are released from the adsorbent material, and the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed, as recited in Appellants' claim 1.

Therefore, Appellant respectfully submits that the Examiner has not made a *prima facie* rejection under 35 U.S.C. § 103(a) because all of the applied prior art references cited fail to teach or suggest each element of the presently claimed invention, as set forth in claim 1.


As claims 4, 6 and 7 depend directly or indirectly from claim 1, Appellant respectfully submits that each of these claims incorporate the patentable aspects thereof, and are therefore allowable for at least same reasons as discussed above.

For all of the above noted reasons, it is strongly contended that certain clear differences exist between the present invention as claimed in claims 1, 4, 6 and 7 and the prior art relied upon by the Examiner.

This final rejection being in error, therefore, it is respectfully requested that this honorable Board of Patent Appeals and Interferences reverse the Examiner's decision in this case and indicate the allowability of application claims 1, 4, 6 and 7.

In the event that this paper is not being timely filed, the Appellant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees which may be due with respect to this paper may be charged to our Deposit Account No. 01-2300, **referencing docket number 107355-00052.**

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APPENDIX 1

CLAIMS ON APPEAL

1. (Previously presented) An exhaust emission control system of an internal combustion engine for cleaning exhaust gases discharged from the internal combustion engine comprising:

an exhaust system defining a main exhaust passage connected to an internal combustion engine, and a bypass exhaust passage that branches off and joins back to the main exhaust passage;

a switching device switching an exhaust gas flow path to either of the main exhaust passage and the bypass exhaust passage;

an adsorbent material disposed within the main exhaust passage for adsorbing unburned constituents of exhaust gases introduced into the main exhaust passage and releasing the unburned constituents as temperature increases; and

a control device operable to control the switching device,

wherein the control device switches the exhaust gas flow path to the main exhaust passage when the adsorbent material adsorbs the unburned constituents, the control device switches the exhaust gas flow path to the bypass exhaust passage only when the adsorbed unburned constituents is released from the adsorbent material, and the control device switches the exhaust gas flow path to the main exhaust passage when a release of the adsorbed unburned constituents is completed.

2. (Original Allowed) The exhaust emission control system for the internal combustion engine according to claim 1, wherein the exhaust system has the bypass exhaust passage including an annular passage portion surrounding in an annular

fashion a portion of the main exhaust passage, on which the adsorbent material is disposed.

3. (Original Allowed) The exhaust emission control system according to claim 2, wherein the switching device has a switching valve element adapted to freely move between an open position where the main exhaust passage is opened whereas the bypass exhaust passage is closed and a closed position where said main exhaust passage is closed whereas the bypass exhaust passage is opened,

a biasing device for biasing the switching valve element to the open position, and
an actuator for driving the switching valve element from the open position to the closed position against the biasing device.

4. (Original) The exhaust emission control system according to claim 1, wherein the switching device has a switching valve element adapted to freely move between an open position where the main exhaust passage is opened whereas the bypass exhaust passage is closed and a closed position where said main exhaust passage is closed whereas the bypass exhaust passage is opened,

a biasing device for biasing the switching valve element to the open position, and
an actuator for driving the switching valve element from the open position to the closed position against the biasing device.

5. (Original Allowed) The exhaust emission control system according to claim 3, wherein the switching device further comprises:

a rotational shaft adapted to be driven to rotate by the actuator; and

an arm connected between the switching valve element and the rotational shaft for driving the switching valve element in conjunction with a rotation of the rotational shaft,

wherein the rotational shaft and the arm are disposed in the bypass exhaust passage.

6. (Original) The exhaust emission control system according to claim 4, wherein the switching device further comprises:

a rotational shaft adapted to be driven to rotate by the actuator; and

an arm connected between the switching valve element and the rotational shaft for driving the switching valve element in conjunction with a rotation of the rotational shaft,

wherein the rotational shaft and the arm are disposed in the bypass exhaust passage.

7. (Previously presented) The exhaust emission control system according to claim 1, wherein the adsorbent material includes a zeolite.